

Amdt. dated February 23, 2004
Reply to Office action of 11/21/2003

Serial No. 09/627,662
Docket No. CA990022US1
Firm No. 0055.0022

REMARKS/ARGUMENTS

Claims 1-26 had been withdrawn in an earlier paper as the result of an earlier restriction requirement. In view of the Examiner's earlier restriction requirement, applicant retains the right to present claims 1-26 in a divisional application.

The Examiner rejected as obvious (35 U.S.C. §103) pending claims 27-30, 37-40, and 47-50 as being unpatentable over Ponnekanti (US 6,591,269) in view of Watkins (US 6,457,017). Applicants have amended independent claims 27, 37, 47 and traverse the claim rejections.

1) Claims 27, 37, and 47.

Independent claims 27, 37, and 47 disclose a system, method, and program for updating an index on a database table when data is added to the table, comprising:

A method for updating an index on a database table when data is added to the table, comprising:

receiving data records to load into the table;

selecting one of a first operation and second operation, wherein the first operation incrementally updates the index on the table as each received data record is added to the table and the second operation rebuilds the index from the table after all the received data records have been added to the table; and

using the selected first operation or second operation to incrementally update or rebuild the index respectively with the data from the received data records.

The Examiner rejected as obvious (35 U.S.C. §103) pending claims 27, 37, 47 as being unpatentable over Ponnekanti (US 6,591,269) in view of Watkins (US 6,457,017). Applicants have amended independent claims 27, 37, 47, such that, the selected first operation or second operation is used to incrementally update or rebuild the index respectively with the data from the

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received data records. The added limitations can be found in at least original claims 27, 37, 47 and pages 6-16 of the application.

The cited Ponnekanti (col. 7: lines 51-63; col. 2: lines 58-60; col. 3: lines 11-30; col. 13: lines 35-67; col. 4: lines 20-26; item 160 in FIG. 1B; col. 4: lines 20-26; col. 13: lines 35-67; col. 3: lines 4-30) discusses rebuilding an index, where the index is stored as a B+- Tree data structure. The cited Watkins (col. 3, lines 10-20) discusses incrementally indexing managed files of a document management system.

Neither the cited Ponnekanti nor the cited Watkins teach or suggest the claim requirement of using the selected first operation (i.e., incremental update) or second operation (i.e., rebuilding the index) to incrementally update or rebuild the index respectively with the data from the received data records. Rebuilding the index (i.e., a full rebuild of the index) in the claim requirements takes place after all the received data records have been added to the table.

In fact, the cited Ponnekanti teaches away from the claim requirements because the cited Ponnekanti repeatedly argues against incremental updates. For example, Ponnekanti in col. 11, lines 60-62 discusses that it is desirable to rebuild a few hundred pages in a transaction. Also, in col. 13, lines 1-15 Ponnekanti discusses the advantage of rebuilding multiple pages in a single action. Ponnekanti in col. 13, lines 11-15 discusses that besides saving log space, it has also been observed that rebuilding multiple pages in a top action reduces the number of visits to level 1 pages significantly, reducing the calls to lock manager, latch manager, and the like. Additionally, in col. 19, lines 43-50 Ponnekanti discusses that by rebuilding multiple leaf pages in each top action, the updates to level 1 pages can be batched resulting in significant reduction in logging an CPU time. In fact, Ponnekanti explicitly argues against incremental update by discussing in col. 18, lines 52-54 that incremental reorganization is difficult and by performing inline reorganization, the approach of Ponnekanti avoids the problems of incremental reorganization.

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The cited Watkins (col. 3, lines 10-20) discusses incrementally indexing managed files of a document management system. However, nowhere does the cited Watkins teach or suggest the claim requirement of using the selected first operation (incremental update) or second operation (rebuilding the index) to incrementally update or rebuild the index respectively with the data from the received data records. In fact, the cited Watkins teaches away from the claim requirements because the cited Watkins performs incremental updates but not rebuilds of the index. Watkins (col. 15: lines 53-55) provides advantages of the approach provided by Watkins by discussing that the system dynamically updates metadata definitions on the fly without rebuilding the database or restarting the system. Watkins (col. 9: lines 52-56) discusses the advantages of adding another attribute to the definition of, for example, a customer folder, without restarting or reorganizing the database. Therefore, the cited Watkins argues against rebuilding the index.

Therefore, neither the cited Ponnekanti nor the cited Watkins teach or suggest the claim requirement of using the selected first operation (incremental update) or second operation (rebuilding the index) to incrementally update or rebuild the index respectively with the data from the received data records. While the cited Ponnekanti discusses rebuilding indexes, the cited Ponnekanti argues against incremental updates. The cited Watkins discusses incremental updates but argues against rebuilding the index. The claims require, selecting the first operation to incrementally update the index or selecting the second operation to rebuild the index and this requirement is neither taught nor suggested by either the cited Watkins or the cited Ponnekanti, either alone or in combination. The claims require selecting between incrementally updating the index or rebuilding the index, whereas Ponnekanti discusses rebuilding the index to the exclusion of incremental updates and Watkins discusses incremental updates to the exclusion of rebuilding the index.

The Examiner mentions (office action page 4) that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings or

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Ponnekanti with the teaching of Watkins so as to obtain an operation of incremental updates to the index in order to increase the database system response time. However, the pending claims require selecting either a first operation to incrementally update an index or selecting a second operation to rebuild the index with the data from the received data records. Neither the cited Ponnekanti nor the cited Watkins teach or suggest selecting between a first operation to incrementally update an index or selecting a second operation to rebuild the index with the data from the received data records.

Even if for the sake of argument, the teachings of Ponnekanti were combined with the teachings of Watkins that would still not render the resulting combination obvious as Ponnekanti explicitly argues against incremental rebuilding, and Watkins argues against rebuilding the index. According to MPEP §2143.01 (page 2100-124) "fact that references can be combined or modified is not sufficient to establish prima facie obviousness" and "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." Applicants submit that the neither Watkins nor Ponnekanti suggests the claimed combination of selecting one of a first operation and second operation, wherein the first operation incrementally updates the index on the table as each received data record is added to the table and the second operation rebuilds the index from the table after all the received data records have been added to the table, and using the selected first operation or second operation to incrementally update or rebuild the index respectively with the data from the received data records. The Examiner is using inappropriate hindsight in suggesting the desirability of the combination

For the above reasons, pending independent claims 27, 37, and 47 are patentable over the cited Ponnekanti and the cited Watkins because neither Ponnekanti nor Watkins teach or suggest all the claim limitations either alone or in combination.

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2) Claims 28-36, 38-46, 48-56

The Examiner has also rejected pending claims 28-36, 38-46 and 48-56 that depend directly or indirectly on the pending independent claims 27, 37, and 47 respectively. Applicants submit that these claims are patentable over the cited art because they depend from claims 27, 37, and 47 respectively which are patentable over the cited art for the reason discussed above, and because the combination of the limitations in the dependent claims 28-36, 38-46, 48-56 and the base and intervening claims from which they depend provide further grounds of distinction over the cited art

3) Claims 28, 38, and 48

Pending claims 28, 38, and 48 depends from claim 27, 37 and 47 respectively and further require determining which of the first operation or second operation is more efficient, wherein the first or second operation determined to be more efficient is the selected operation used for updating the index with the received data records.

The cited Ponnekanti (co. 13: lines 50-67) discusses updating the index by rebuilding the index via insert and delete operations. The first operation of the claim requirements is for incrementally updating the index and the second operation of the claim requirements is for rebuilding the index. Nowhere, does the cited Ponnekanti teach or suggest the first operation of incrementally updating the index.

For the above reasons, pending independent claims 28, 38, and 48 are patentable over the cited Ponnekanti and the cited Watkins, because neither the cited Ponnekanti nor the cited Watkins teach or suggest all the claim limitations either alone or in combination.

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4) Claims 29, 39, and 49

Pending claims 29, 39, and 50 depends from claim 28, 38 and 48 respectively and further require determining which operation is more efficient is a function of a percentage of the received data records to add to the table and characteristics of the index.

Nowhere does the cited Ponnekanti (col. 8, lines 22-30; col. 9: lines 48-55; col. 11: lines 15-28) teach or suggest the claim requirements of determining which operation is more efficient as a function of a percentage of the received data records to add to the table and characteristics of the index.

Col. 8, lines 22-30 of the cited Ponnekanti discusses rebuilding an index in a B+- tree with no teaching or suggestion of determining between the relative efficiency of a first operation (incremental update) and a second operation (rebuilding the index after all data records have been added).

Col. 9, lines 48-55 of the cited Ponnekanti discusses the likelihood of blocking which does not teach or suggest in any way the determination of the relative efficiency of a first operation (incremental update) and a second operation (rebuilding the index after all data records have been added).

Col 11, lines 15-28 of the cited Ponnekanti discusses retraversal strategies of the B+- tree with no teaching or suggestion of determining between the relative efficiency of a first operation (incremental update) and a second operation (rebuilding the index after all data records have been added).

For the above reasons, pending dependent claims 29, 39, and 49 are patentable over the over the cited over the cited Ponnekanti and the cited Watkins, because neither the cited Ponnekanti nor the cited Watkins teach or suggest all the claim limitations either alone or in combination.

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5) Claims 32, 42, and 52

Pending claims 32, 42, and 52 depends from claims 28, 38, and 48 respectively and further require determining which operation is more efficient further comprises considering at least one of a following factors: an estimated time required to extract index keys from the table, an estimated time to sort the index keys, and an estimated time to rebuild the index from the sorted keys.

Nowhere does the cited Ponnekanti (col. 2, lines 1-16; col. 6: lines 30-45; col. 13: lines 35-67; col. 16: lines 2-67) teach or suggest the claim requirements of determining which operation is more efficient by considering at least one of a following factors: an estimated time required to extract index keys from the table, an estimated time to sort the index keys, and an estimated time to rebuild the index from the sorted keys. The cited Ponnekanti discusses rebuilding the index without incremental updates and does not teach or suggest determining which operation (i.e., the first operation of incremental update or the second operation of rebuilding the index) is more efficient as required by the claims.

For the above reasons, pending dependent claims 32, 42, and 53 are patentable over the over the cited over the cited Ponnekanti and the cited Watkins, because neither the cited Ponnekanti nor the cited Watkins teach or suggest all the claim limitations either alone or in combination.

6) Claims 33, 43, and 53

Pending claims 33, 43, and 53 depends from claims 28, 38, and 48 respectively and further require maintaining a list of threshold values for different index sizes and using the number of received data records to add to the table to determine a comparison value, wherein determining whether the first or second operation is more efficient is based on the comparison value and the threshold for the size of the index to be updated.

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Nowhere does the cited Ponnekanti (col. 2, lines 1-16; col. 6: lines 30-45; coil. 13: lines 35-67; col. 16: lines 2-67) teach or suggest the claim requirements of maintaining a list of threshold values for different index sizes and using the number of received data records to add to the table to determine a comparison value, wherein determining whether the first or second operation is more efficient is based on the comparison value and the threshold for the size of the index to be updated. The cited Ponnekanti discusses rebuilding the index without incremental updates and does not teach or suggest determining which operation (i.e., the first operation of incremental update or the second operation of rebuilding the index) is more efficient based on the comparison value and the threshold for the size of the index to be updated as required by the claims.

For the above reasons, pending dependent claims 33, 43, and 55 are patentable over the over the cited over the cited Ponnekanti and the cited Watkins, because neither the cited Ponnekanti nor the cited Watkins teach or suggest all the claim limitations either alone or in combination.

7) Claims 36, 46, and 56

Pending claims 36, 46, and 56 depend from claims 33, 43, and 53 respectively and further require that the first operation is more efficient if the comparison value is less than the threshold value and wherein the second operation is more efficient if the comparison value is greater than the threshold value.

Nowhere does the cited Ponnekanti teach or suggest the claim requirement that the first operation (i.e., incremental update) is more efficient if the comparison value is less than the threshold value and wherein the second operation (rebuilding the index) is more efficient if the comparison value is greater than the threshold value.

The cited Ponnekanti (col. 7: lines 50-55; col. 5: lines 56-67; col. 7: lines 55-64; fig 2B; col. 7, lines 1-28; col. 8, lines 31-50; col. 13: lines 50-67) discuss rebuilding the index but not

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rebuilding the index. Nowhere does the cited Ponnekanti teach or discuss the claim requirement of that the first operation (i.e., incremental update) is more efficient if the comparison value is less than the threshold value and wherein the second operation (rebuilding the index) is more efficient if the comparison value is greater than the threshold value. In contrast, the cited Ponnekanti discusses efficiency issues in rebuilding the index without incremental updates.

For the above reasons, pending dependent claims 33, 43, and 55 are patentable over the over the cited over the cited Ponnekanti and the cited Watkins, because neither the cited Ponnekanti nor the cited Watkins teach or suggest all the claim limitations either alone or in combination.

New claims 57-65

The added limitations of the new claims 57-59 may be found at least in original claims 1, 2, 5, 10, page 10, lines 5-10, original claims 1-26, and in pages 2-16 of the original application.

Conclusion

For all the above reasons, Applicant submits that the pending claims 27-59 are patentable over the art of record. Applicants have added nine new claims and indicated appropriate fees. Nonetheless, should any additional fees be required, please charge Deposit Account No. 50-0585.

The attorney of record invites the Examiner to contact him at (310) 557-2292 if the Examiner believes such contact would advance the prosecution of the case.

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By: Rabindranath Dutta

Rabindranath Dutta
Registration No. 51,010

Please direct all correspondences to:

Rabindranath Dutta
Konrad Raynes Victor & Mann, LLP
315 South Beverly Drive, Ste. 210
Beverly Hills, CA 90212
Tel: 310-557-2292
Fax: 310-556-7984